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Schoeps

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[54] **METHOD AND DEVICE FOR KEEPING CLEAN ENDS OF SPRAY DAMPING MECHANISM NOZZLES ON ROTARY PRINTING PRESS**

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[51] **Int. Cl.**[7] **B41F 35/00**

[52] **U.S. Cl.** **101/424**; 101/483

[58] **Field of Search** ..... 101/424, 425, 101/423, 483, 489, 147, 148, 336; 346/140 R

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,813,675	5/1974	Steffy et al.	346/75
4,007,465	2/1977	Chaudhary	346/140
4,044,674	8/1977	Smith, Jr.	101/148
4,241,656	12/1980	Smith	101/148
4,268,836	5/1981	Huliba et al.	346/75
4,537,354	8/1985	Eith	239/102
4,563,688	1/1986	Braun	346/1.1
4,600,928	7/1986	Braun et al.	346/1.1
4,849,769	7/1989	Dressler	346/1.1

FOREIGN PATENT DOCUMENTS

0126536	11/1984	European Pat. Off. .
0422400	4/1991	European Pat. Off. .
0621134	10/1994	European Pat. Off. .
3108541	11/1982	Germany .
3209139	9/1983	Germany .
4038662	6/1992	Germany .

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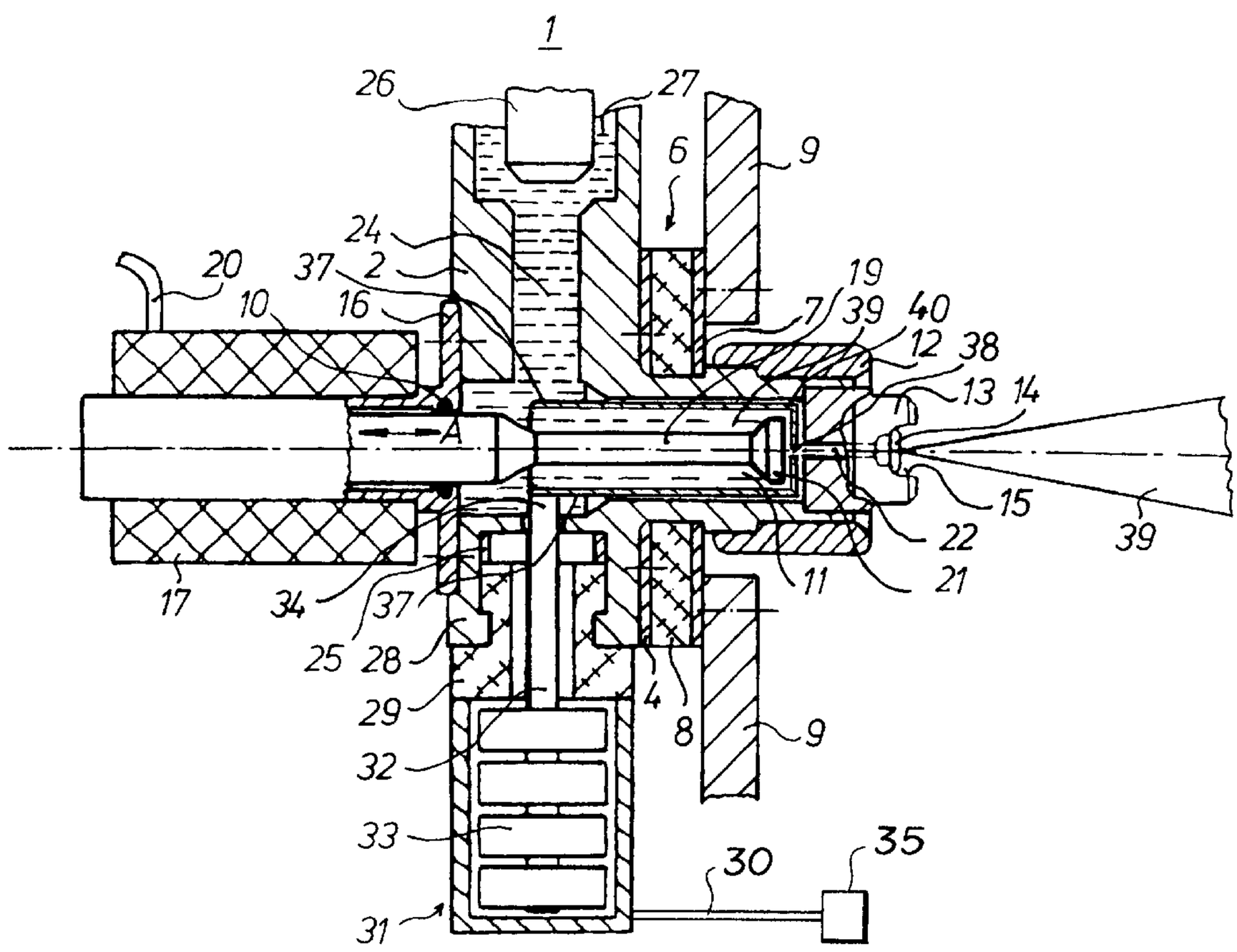
[57] **ABSTRACT**

Deposits are removed from the end of a spray dampening nozzle which is used to spray pressurized fluid that is delivered to the nozzle end. This fluid is activated by ultrasound before it exits the nozzle end. The activation of the fluid can be accomplished upstream of, or at the nozzle end. An ultrasound vibrator is used to activate the fluid and is either directly or indirectly connected to the fluid by a vibration transmitter.

2 Claims, 1 Drawing Sheet



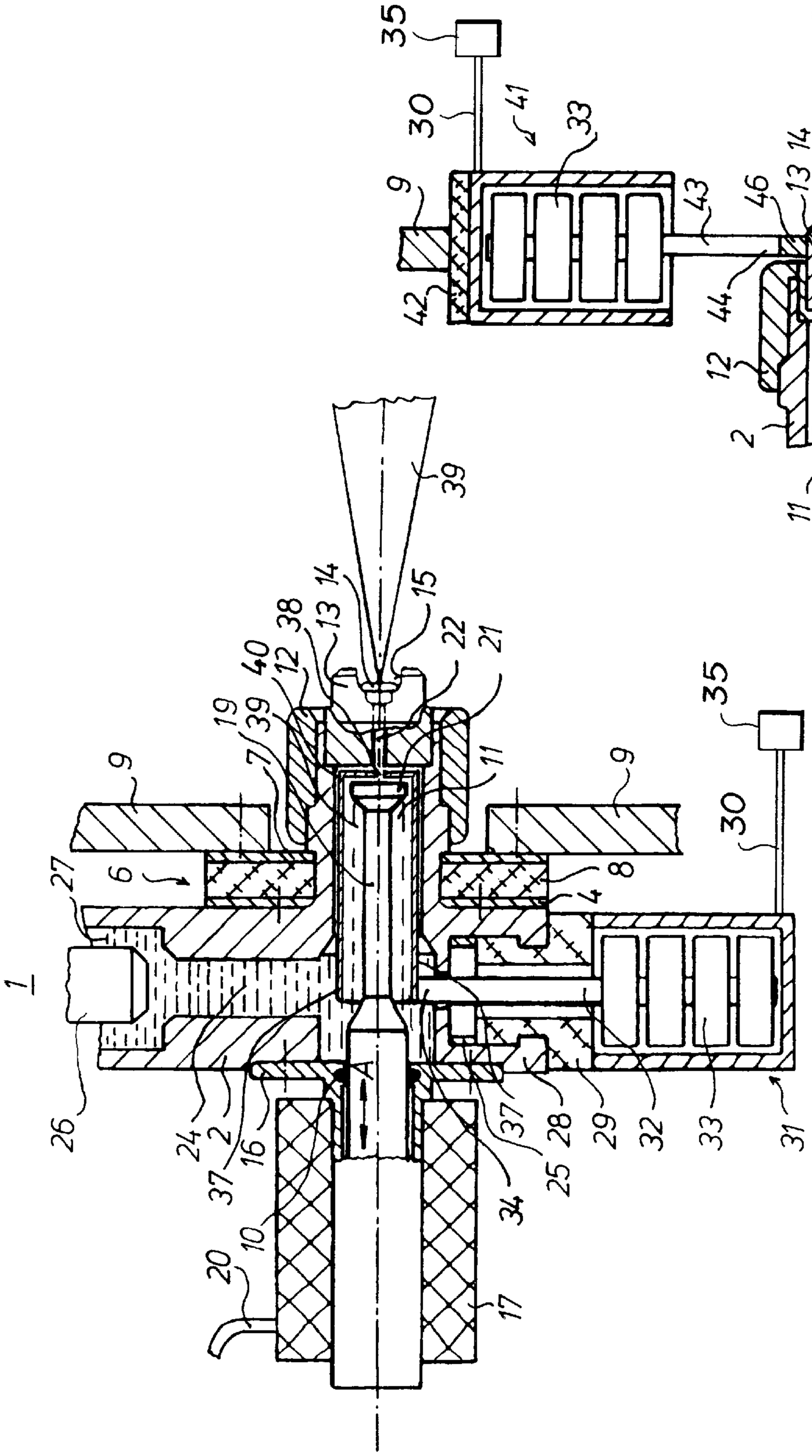

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Fig. 1

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Fig. 2

METHOD AND DEVICE FOR KEEPING CLEAN ENDS OF SPRAY DAMPING MECHANISM NOZZLES ON ROTARY PRINTING PRESS

FIELD OF THE INVENTION

The present invention relates to a method keeping clean a nozzle mouthpiece of a nozzle of a spray moistening device of a rotary printing press; the and to a device for executing the method.

DESCRIPTION OF THE PRIOR ART

A spray moistening device with spray nozzles, which are arranged next to each other in the axial direction on a so-called spray beam for moistening a printing cylinder of an offset rotary printing press, is known from U.S. Pat. No. 4,044,647.

U.S. Pat. No. 4,241,656 discloses a self-cleaning nozzle of a spray moistening device for a rotary printing press. Here, a moistening agent is swirled with air after exiting from a nozzle mouthpiece.

EP 0 126 536 A2 describes a pushbutton for a ink jet printer. The ink reservoir, the nozzle plate and nozzle bores arranged therein are cleaned by means of ultrasound excitation. The ultrasound excitation is activated during the cleaning operation.

DE 31 08 541 A1 discloses a device for generating a moistening agent fog for a moistening device of an offset printing press, using an ultrasound atomizer.

SUMMARY OF THE INVENTION

It is the object of the present invention to provide a method for keeping the nozzle mouthpieces of a spray moistening device clean, as well as an associated device, by means of which it is possible to perform preventive maintenance on spray nozzles of a spray moistening device without having to remove them.

This object is attained in accordance with the present invention by periodically activating the moistening agent that is supplied to the nozzle mouthpieces of the spray moistening device by the use of ultrasound upstream of, or in the nozzle mouthpieces. An ultrasound vibration transmitter is in communication with the fluid either in an upstream fluid chamber, or at the nozzle mouthpiece;

The advantages which can be achieved by means of the present invention lie, in particular, in that the fluid conducted through the nozzles can be activated by means of ultrasound because of the arrangement of a moistening agent, which in the operational state, is not activated by ultrasound during a spraying process and is charged with pressure, or respectively by an ultrasound vibration transmitter, which can be switched on during a cleaning process. When the fluid activated by ultrasound exits through the nozzles, the paper and ink particles on the nozzle outlet opening, or respectively on the nozzle mouthpiece, are removed.

In this way, it is easily possible to perform preventive cleaning of the spray nozzles without having to remove the nozzles. A long, trouble-free operation of the moistening device is made possible by the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is represented in the drawings by two preferred embodiments and will be described in more detail in what follows. Shown are in:

FIG. **1**, a cross section through the schematic representation of a spray nozzle unit with a device; in accordance with a first preferred embodiments of the present invention; and

FIG. **2**, a detailed representation of a spray nozzle with a device in a second preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A nozzle unit **1** of a spray moistening device for moistening objects, such as, in particular a rotatable moistening distribution roller, consists of a nozzle housing **2**, which is fastened by means of fastening elements, for example screws, on a first sheet metal plate **4** of a vibration-damping plate generally at **6**. The vibration-damping plate **6** is arranged by means of screws on a crosspiece **9** of a nozzle beam. crosspiece **9** receives a plurality of nozzle units **1** arranged at a distance next to each other.

The nozzle housing **2** has a chamber **11**, which extends in the interior of nozzle housing **2** in the horizontal direction, for example, and which is bordered on one side by a nozzle mouthpiece **13**, held in place by a union nut **12**, and a nozzle **14** fastened thereon. On its side opposite the nozzle mouthpiece **13**, the chamber **11** is bordered by a coil holder **16**, that is screwed to the nozzle housing **2**, and which supports or holds a magnetic coil **17**. A valve rocker **19** is arranged in the interior of the magnetic coil **17** valve rocker **19** has, at its end facing the nozzle mouthpiece **13**, a sealing element **21** for closing an outlet bore **22** located in the nozzle mouthpiece **13**. The magnetic coil **17** is provided with a connecting cable **20**. During the operation of the magnetic coil **17**, the valve rocker **19** can be moved back and forth in the horizontal direction A, so that the bore **22** located in the nozzle mouthpiece **13** will be opened and closed by means of the sealing element **21**. The valve rocker **19** is sealed against the chamber **11** at the end of the magnetic coil **17** by means of a sealing ring **10**.

The nozzle housing **2** has a supply bore **24**, for example on its upper side, which is connected with the chamber **11** and, via a valve **26**, with a pressurized water inlet **27**. Opposite the bore **24** for the water inlet **27**, the nozzle housing **2** is provided with a fastening connector **28**, which is also connected with the chamber **11**. The fastening connector **28** receives, in its axial direction, a profiled, pipe-shaped intermediate piece **29**, which is made of a vibration-damping material and on whose end is fastened a known ultrasound vibration generator **31**. The ultrasound vibration generator **31** is provided with a cable **30** extending to a controls means **35**. A sealing ring **25** is arranged between the intermediate piece **29** and the nozzle housing **2**.

The ultrasound vibration generator **31** can be embodied as a piezo-mechanical ultrasound vibration generator with a generated frequency between 20 and 30 kHz, which has a plurality, for example four, ceramic rings **33** arranged one behind the other on a rod-shaped vibration transmitter **32**. An interior end **34** of the rod-shaped vibration transmitter **32**, which points in the direction toward the chamber **11** and protrudes out of the ultrasound vibration generator **31**, extends at least as far as into the chamber **11**, as seen in FIG. **1**.

The following procedure is followed in the course of cleaning the nozzle insert **14**, or respectively the nozzle mouthpiece **13**: the sealing element **21**, which is located on the valve rocker **19**, is fixed in place at a distance from the outlet bore **22** of the nozzle mouthpiece **13** in such a way that

when the valve **26** is open a pressurized fluid **39**, for example water, can exit through the chamber **11**, the outlet bore **22** as well as the bore in the nozzle insert **14** at a spraying pressure of 3.5 bar, for example. The water inside the chamber **11** is activated by ultrasound by switching on the ultrasound vibration generator **31** through the control means **35**. In the process, the water is alternatingly placed in a traction phase and an overpressure phase by means of the vibration transmitter **32** protruding into the chamber **11** with its vibration-transmitting end **34**. When the water exits the nozzle insert **14**, the shock waves being generated in the water destroy the accumulations of dirt, typically consisting of paper and ink particles, located on the nozzle mouthpiece **13** or on the nozzle insert **14**.

The vibration-damping components **29**, **6** are arranged to protect the nozzle housing **2** as well as the crosspiece **9** supporting the nozzle unit **1** from direct ultrasonic effects.

In accordance with a variant of the above described embodiment, the vibration as seen in FIG. **1**, transmitting end **34** of the vibration transmitter **32** is connected with the beginning or first or inner end of a vibration-transmitting cup **37** that is arranged coaxially with the valve rocker **19**. An outer or second end **40** of the vibration-transmitting cup **37** extends as far as the nozzle mouthpiece **13** and is provided there with a centered bore **38**. Because of this arrangement, during the cleaning process, the fluid **39** supplied through the valve **26** and located in the chamber **11** can pass through the outlet bore **22** as well as the nozzle insert **14** when the sealing element **21** of the valve rocker **19** has been retracted.

Because of the additional inclusion of the vibration-transmitting cup **37**, it is possible to transmit the ultrasound directly as far as the vicinity of the nozzle mouthpiece **13** and therefore into the vicinity of the nozzle insert **14**. Inside the chamber **11**, the fluid **39** is thus in direct connection with the vibration transmitter which includes the transmitter **31**, rod **32** and cup **37**.

In accordance with a second preferred embodiment of the present invention, an ultrasound vibration generator **41** is arranged, fixed in place on the crosspiece **9**, by means of a vibration-damping holder **42**, and above a nozzle mouthpiece **13** receiving a nozzle insert **14**, all as seen in FIG. **2**. A rod-shaped vibration transmitter **43** connects a number of ceramic rings **33**. This vibration transmitter **43** is fixedly connected, with its vibration-transmitting end **44**, which is located outside of the ultrasound vibration generator **41**, with a ring-shaped holder **46** that is fixedly arranged around the nozzle mouthpiece **13**, or which is connected directly with the nozzle mouthpiece **13**. In this case, the nozzle mouthpiece **13** can be provided with a coating **23**, which is insensitive to ultrasound vibrations, on its circumference as well as on its side facing away from the nozzle insert **14**, again as shown in FIG. **2**.

The fluid **39** exiting from the nozzle insert **14** is in indirect contact, -via the nozzle insert **14**, the nozzle mouthpiece **13**, and the vibration transmitter **43** with the ultrasound vibration generator **41**.

It is also possible to clean a nozzle insert **14** during the clocked or timed output of the moistening agent through the nozzle insert **14**, i.e. during the opening of the electromagnetically actuated valve rocker **19**, or respectively of the sealing element **21**. The flowthrough amount of moistening agent through the nozzle insert **14** is a function of the press speed. With a continuous valve opening time, for example of 15 ms, a clock period length, for example of 250 ms, can be changed. By means of the permanent switching on of the ultrasound vibration generator **31** or **41** over a defined period of time, for example **30** s, the moistening agent exiting the nozzle insert **14** is activated several times by ultrasound and thus will have destroyed the paper and ink particles located at the nozzle insert **14**.

The same result can be achieved if the moistening agent is in indirect contact with the ultrasound transmitter **32** or **43**.

While preferred embodiments of a method and device for keeping clean ends of spray damping mechanism nozzles on a rotary printing press in accordance with the present invention have been set forth fully and completely hereinabout, it will be apparent to one of skill in the art that a number of changes in, for example, the types of printing press used, the specific type of printing being done, the fluid supply system and the like may be made without departing from the true spirit and scope of the present invention which is accordingly to be limited only by the following claims.

What is claimed is:

1. A method for keeping a nozzle mouthpiece of a nozzle of a spraying device for a spray moistening device of a rotary printing press clean including:

providing a moistening fluid;

providing a spray moistening device;

providing a nozzle unit in said spray moistening device, said nozzle unit having a moistening fluid receiving chamber and a nozzle mouthpiece;

selectively operating said spray moistening device in one of an operational state and a cleaning process;

supplying said moistening fluid under pressure to said nozzle mouthpiece through said moistening fluid receiving chamber while said spray moistening device is operating in both said operational state and said cleaning process;

providing an ultrasound vibration generator;

providing an ultrasound vibration transmitter extending between said ultrasound vibration generator and said nozzle unit;

operating said ultrasound vibration generator;

using said ultrasound vibration transmitter for ultrasonically activating said moistening fluid supplied to said nozzle mouthpiece only when said spray moistening device is operating in said cleaning process; and

using said ultrasonically activated moistening fluid for cleaning said nozzle mouthpiece only when said spray moistening device is operating in said cleaning process.

2. A device for keeping a nozzle mouthpiece of a nozzle of a spraying device for a spray moistening device of a rotary printing press clean comprising:

a spray moistening device operable in both an operational state and a cleaning process, said spray moistening device including a nozzle unit;

a nozzle housing in said nozzle unit, said nozzle housing including a moistening fluid receiving chamber;

means to supply a moistening fluid to said moistening fluid receiving chamber;

a nozzle mouthpiece secured in said nozzle housing in fluid communication with said fluid receiving chamber and receiving said moistening fluid;

a periodically operable ultrasound vibration generator; and

an ultrasound vibration transmitter extending between said ultrasound vibration generator and said nozzle unit and ultrasonically activating said moistening fluid in

said nozzle mouthpiece, said ultrasound vibration generator including control means for operating said ultrasound vibration generator to ultrasonically activate said moistening fluid through said ultrasound vibration transmitter only when said spray moistening device is operating in said cleaning process.

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